FINAL ANSWER KEY

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Exam:	Research Assistant Microbiology
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Question1:-
Phase contrast Microscope is best used to study

A:-
Live unstained bacteria and parasites

B:-
Negative stained spirochetes

C:-
Auramine stained parasitic smears

D:-
Spore stained bacteria

Correct Answer:- Option-A

Question2:-
Which of the following enzymes mediate insertion and excision of gene cassettes ?

A:-
DNA gyrase

B:-
Transposase

C:-
RecA recombinas

D:-

Integrase

Correct Answer:- Option-D

Question3:-

Which of the following is correct regarding the DNA proof reading mechanism ?

A:-

5′ → 3′ exonuclease activity

B:-

3′ → 5′ exonuclease activity

C:-

5′ → 3′ polymerase activity

D:-

Endonuclease activity

Correct Answer:- Option-B

Question4:-

During biofilm development, the irreversible genomic reprogramming that confers antimicrobial tolerance MOST commonly begins at which stage ?

A:-

State of initial attachment

B:-

Microcolony formation with quorum sensing

C:-

Early Biofilm maturation

D:-

Late biofilm maturation with nutrient limitation

Correct Answer:- Option-B

Question5:-

In BLAST analysis (Bioinformatics), which parameter primarily determines the statistical significance of a sequence alignment ?

A:-

Percent identity

B:-

Alignment length

C:-

E-value

D:-

Bit score

Correct Answer:- Option-C

Question6:-

Which force primarily enables sample movement in an immunochromatographic strip ?

A:-

Capillary action

B:-

Centrifugal force

C:-

Gravity

D:-

Osmotic pressure

Correct Answer:- Option-A

Question7:-

Which of the following statement is true for a Class II B2 biosafety cabinet used in BSL-3 labs ?

A:-

30% air is exhausted outside

B:-

70% air is recirculated

C:-

100% air is exhausted through HEPA filter

D:-

No HEPA filtration is required

Correct Answer:- Option-C

Question8:-

Regarding competitive ELISA, all of the following statements are true EXCEPT

A:-

It is useful for detecting small antigens with a single epitope

B:-

The signal intensity is inversely proportional to the concentration of antigen in the sample

C:-

It can be used when the antigen concentration is very high in the sample

D:-

It requires a secondary enzyme-labelled antibody for detection

Correct Answer:- Option-D

Question9:-

A tertiary care hospital generates the following biomedical wastes. Which of the following is correctly matched with the appropriate BMW colour code as per Biomedical Waste Management Rules (India) ?

A:-

Used disposable syringes (without needle) $\rightarrow$ blue bag

B:-

Used PPE gown $\rightarrow$ red bag

C:-

Broken contaminated glass slides $\rightarrow$ white container

D:-

Expired cytotoxic drugs $\rightarrow$ Yellow bag

Correct Answer:- Option-D

Question10:-

All of the following materials or situations are contraindications for hydrogen peroxide plasma sterilisation, EXCEPT

A:-

Cotton gauze dressing material

B:-

Long, narrow lumened endoscopic instruments

C:-

Liquids and aqueous drug preparations

D:-

Heat-sensitive plastic surgical instruments

Correct Answer:- Option-D

Question11:-

Identify the correct statement from the following :

A:-

Fibroin polypeptide chains are predominantly in α helix

B:-

Collagen contains significant amounts of cysteine residues

C:-

Proline strongly disrupts α-helix formation

D:-

The α-keratin helix is a left-handed α-helix

Correct Answer:- Option-C

Question12:-

Lactose is a disaccharide that upon hydrolysis, yields

A:-

D-Galactose and D-Mannose

B:-

D-Fructose and D-Galactose

C:-

D-Glucose and D-Fructose

D:-

D-Galactose and D-Glucose

Correct Answer:- Option-D

Question13:-

Which of the following statements are correct ?

i. The rigid component of bacterial cell walls is a hetero-polymer of alternating ($\beta \rightarrow 4$)-linked N-acetylglucosamine and N-acetylmuramic acid residue

ii. The glycosaminoglycan hyaluronic acid contains alternating residues of D-glucuronic acid and N-acetylglucosamine

iii. Dextran is a heteropolysaccharide found in plant cell wall

A:-

Only i and iii

B:-

Only i and ii

C:-

Only ii and iii

D:-

All of the above (i, ii and iii)

Correct Answer:- Option-B

Question14:-

Which glycolytic step is irreversible and regulated ?

A:-

Glucose-6-phosphate → Fructose-6 phosphate

B:-

Fructose-6-phosphate → Fructose-1, 6 bisphosphate

C:-

Glyceraldehyde 3-phosphate → 1, 3 Bisphosphoglycerate

D:-

2-Phosphoglycerate → Phosphoenolpyruvate

Correct Answer:- Option-B

Question15:-

Which plant secondary metabolite absorbs ultraviolet (UV) radiation and thus provides protection to plant cells against UV rays ?

A:-

Glycosides

B:-

Alkaloids

C:-

Flavonoids

D:-

Tannins

Correct Answer:- Option-C

Question16:-

Which of the following statement is/are correct about pentose phosphate pathway ?

i. NADPH from the pentose phosphate pathway is critical for protecting erythrocytes from oxidative damage and deficiency of glucose-6-phosphate dehydrogenase leads to serious clinical effects.

ii. The reactions of the non-oxidative part of the pentose phosphate pathway are irreversible.

iii. Pentose phosphate pathway is active in liver, adrenal gland and adipose tissue.

A:-

Only i and ii

B:-

Only i and iii

C:-

Only ii and iii

D:-

All of the above (i, ii and iii)

Correct Answer:- Option-B

Question17:-

In the first committed step of purine biosynthesis, the amino group attached to C-1 of Phosphoribosyl pyrophosphate to form 5-phosphoribosylamine is donated by

A:-

Alanine

B:-

Glycine

C:-

Glutamine

D:-

Aspartate

Correct Answer:- Option-C

Question18:-

Hexokinase requires which metal ion for its catalytic activity ?

A:-

Mg^{2+}

B:-

Fe^{2+}

C:-

Na^{+}

D:-

Ca^{2+}

Correct Answer:- Option-A

Question19:-

Microbial xylanases are widely used for

A:-

Starch processing

B:-

Pulp and paper industry

C:-

Milk pasteurization

D:-

Proteins stain removal in detergents

Correct Answer:- Option-B

Question20:-

Which of the following lipid act as a second messenger ?

A:-

Sphingomyelin

B:-

Plasmalogen

C:-

Diacylglycerol

D:-

Ganglioside

Correct Answer:- Option-C

Question21:-

Which one of the following techniques is not suitable for the confirmational dynamics of proteins ?

A:-

Mass spectroscopy

B:-

Fluorescent microscopy

C:-

NMR spectroscopy

D:-

Differential scanning spectroscopy

Correct Answer:- Option-B

Question22:-

Which of these is true for density gradient centrifugation ?

A:-

Fast sedimenting component will sediment as the upper layer

B:-

Low density molecules will sediment as the lower layer

C:-

Highest density of the sample particle must be lesser than that of the highest density portion of the gradient

D:-

High density molecules will sediment as the lower layer

Correct Answer:-Question Cancelled

Question23:-

Expand MALDI-TOF MS

A:-

Matrix-Assisted Laser Desorption Ionization-Time of Flight Mass Spectroscopy

B:-

Matrix-Assisted Light Desorption Ionization-Time of Flight Mass Spectroscopy

C:-

Matter-Assisted Light Desorption Ionization-Time of Fragment Mass Spectroscopy

D:-

Molecules-Assisted Laser Desorption Ionization-Time of Flight Mass Spectroscopy

Correct Answer:- Option-A

Question24:-

Identify correct statement.
Statement 1 : Diffusion is an entropy driven process
Statement 2 : High energy phosphate compounds have very large negative free energies of hydrolysis

A:-

Both the statements are correct

B:-

Both the statements are wrong

C:-

Only statement 1 is correct

D:-

Only statement 2 is correct

Correct Answer:- Option-A

Question25:-

Separation of dissolved materials from colloidal particles in a solution by selective diffusion through a semi permeable membrane is called

A:-

Chromatography

B:-

HPLC

C:-

Dialysis

D:-

TLC

Correct Answer:- Option-C

Question26:-

The difference between facilitated diffusion and active transport is

A:-

Facilitated diffusion does not require a concentration gradient but active transport require

B:-

Active transport require energy but facilitated diffusion doesn't require energy

C:-

Active transport requires protein carriers but facilitated diffusion doesn't require protein carriers

D:-

None of these

Correct Answer:- Option-B

Question27:-

The basis of Raman spectroscopy is

A:-

Spinning of electrons

B:-

Adsorption and cohesion

C:-

Ionic vibration

D:-

Inelastic scattering

Correct Answer:- Option-D

Question28:-

The most appropriate combination in the calomel electrode of the pH meter is

A:-

Zinc chloride and Mercury

B:-

Mercuric chloride and Mercury

C:-

Magnesium chloride and Silver

D:-

Silver chloride and Magnesium

Correct Answer:-Question Cancelled

Question29:-

Scientists won Nobel prize in 1952 for their discovery of NMR ?

A:-

Bloch and Purcell

B:-

Penrose and Genzel

C:-

Bardeen and Cooper

D:-

Cronin and Fitch

Correct Answer:- Option-A

Question30:-

Suggest a suitable method to purify a specific antibody from serum

A:-

SDS PAGE

B:-

Exclusion chromatography

C:-

Affinity chromatography

D:-

Reverse phase chromatography

Correct Answer:- Option-C

Question31:-

The correct sequence of steps involved in nucleic acid extraction are

A:-

Cell lysis, precipitation, washing, elution

B:-

Cell lysis, washing, elution, precipitation

C:-

Precipitation, cell lysis, washing, elution

D:-

Cell lysis, washing, precipitation, elution

Correct Answer:- Option-A

Question32:-

In electrophoresis, DNA migrate towards _____

A:-

Anode/negative electrode

B:-

Cathode/negative electrode

C:-

Anode/positive electrode

D:-

Cathode/positive electrode

Correct Answer:- Option-C

Question33:-

The PCR technique was developed by

A:-

Milstein

B:-

Kohler

C:-

Kary Mullis

D:-

Altman

Correct Answer:- Option-C

Question34:-

All are true about transposition EXCEPT

A:-

It does not require DNA homology

B:-

Self replicating

C:-

Call Jumping genes

D:-

Discovered by Barbara McClintock

Correct Answer:- Option-B

Question35:-

All are methods of horizontal gene transfer in bacteria EXCEPT

A:-

Transformation

B:-

Transduction

C:-

Conjugation

D:-

Mutation

Correct Answer:- Option-D

Question36:-

The phenotypic method for detecting mutants are all EXCEPT

A:-

Fluctuation test

B:-

Replica plating

C:-

Ames test

D:-

Sequencing

Correct Answer:- Option-D

Question37:-

Primers are generally _____ in length.

A:-

Same as template

B:-

18-30 bp

C:-

5-10 bp

D:-

40-50 bp

Correct Answer:- Option-B

Question38:-

Melting temperature is calculated by

A:-

4(G + C) + 2(A + T)

B:-

4(G + A) + 2(C + T)

C:-

2(G + C) + 4(A + T)

D:-

2(G + A) + 4(C + T)

Correct Answer:- Option-A

Question39:-

Quantitative and qualitative detection of nucleic acid is done by

A:-

Conventional PCR

B:-

Real time PCR

C:-

Nested PCR

D:-

All of the above

Correct Answer:- Option-B

Question40:-

Validity parameter for quantitative PCR depends on

A:-

R^2 value

B:-

Slope

C:-

Efficiency

D:-

All of the above

Correct Answer:- Option-D

Question41:-

Which of the following best describes a recombinant vector vaccine ?

A:-

A vaccine that contains inactivated or weakened forms of the entire pathogen to stimulate immunity

B:-

A vaccine that uses synthetic peptides corresponding to pathogen antigen to elicit an immune response

C:-

A vaccine that uses a modified virus to deliver genes from a pathogen into the host cells, prompting an immune response

D:-

A vaccine that contains the DNA of a pathogen, which is taken up by host cells to trigger immunity

Correct Answer:- Option-C

Question42:-

Match the type of grafts with their correct descriptions.

Column A (Graft type)	Column B (Description)
a. Autograft	1. Graft transplanted from one species to another species
b. Allograft	2. Graft transplanted from one individual to another genetically identical individual
c. Isograft	3. Graft transplanted from one part of the individual to another part of the same individual
d. Xenograft	4. Graft transplanted from one individual to another individual of the same species

A:-

a – 4, b – 1, c – 2, d – 3

B:-

a – 3, b – 2, c – 4, d – 1

C:-

a – 4, b – 1, c – 3, d – 2

D:-

a – 3, b – 4, c – 2, d – 1

Correct Answer:- Option-D

Question43:-

Small molecules that can induce an immune response only when attached to a large carrier protein are known as

A:-

Adjuvants

B:-

Haptens

C:-

Epitopes

D:-

None of the above

Correct Answer:- Option-B

Question44:-

Which of the following factors does not influence the immunogenicity of an antigen ?

A:-

Size of the antigen

B:-

Complexity of the antigen

C:-

Age of biological host

D:-

None of the above

Correct Answer:- Option-D

Question45:-

The maternal antibody present in the circulation of a two month old breast-fed baby is

A:-

IgA

B:-

IgD

C:-

IgE

D:-

IgG

Correct Answer:-Question Cancelled

Question46:-

BCG is used to protect against

A:-

Tuberculosis

B:-

Rabies

C:-

Hepatitis B

D:-

Influenza

Correct Answer:- Option-A

Question47:-

A small protein subunit used in a vaccine may fail to stimulate T-cell immunity because of

A:-

Lack of glycosylation

B:-

Inherently insufficient antigen concentration

C:-

Lack of carrier determinants

D:-

HLA-related unresponsiveness

Correct Answer:- Option-D

Question48:-

HIV binds to

A:-

IL-2 receptor

B:-

CD4

C:-

NF Kappa B

D:-

Reverse transcriptase

Correct Answer:- Option-B

Question49:-

Western blots are primarily used to detect

A:-

Carbohydrate

B:-

Lipid

C:-

Protein

D:-

DNA

Correct Answer:- Option-C

Question50:-

In Complement system, Complement component C3 is cleaved by

A:-

C3b

B:-

C3bBb

C:-

Factor B

D:-

Factor D

Correct Answer:- Option-B

Question51:-

Which of the following is correct of Community associated MRSA (CA-MRSA) ?

A:-

Less virulent than Hospital associated MRSA (HA-MRSA)

B:-

Express Panton-Valentine toxin which causes tissue necrosis

C:-

Express mec-A gene subtypes I, II, III

D:-

Cloxacillin is used for treatment of skin and soft tissue infections

Correct Answer:- Option-B

Question52:-

Mechanism of action of cholera toxin

A:-

Inhibits protein synthesis by inhibiting 60S ribosome

B:-

Causes ADP ribosylation of G protein and increases intracellular cAMP

C:-

Causes ADP ribosylation of elongation factor inhibiting protein synthesis

D:-

Causes glycosylation of GTP binding proteins

Correct Answer:- Option-B

Question53:-

Which of the following correct regarding Nipah virus ?

A:-

Causes encephalitis in humans

B:-

Fruit bats are the natural reservoirs

C:-

Diagnosis is by Real time PCR of throat and nasal swabs

D:-

All of the above

Correct Answer:- Option-D

Question54:-

Presence of ingested RBCs in cytoplasm of trophozoites is diagnostic of

A:-

Giardia lamblia

B:-

Entamoeba dispar

C:-

Entamoeba histolytica

D:-

Entamoeba coli

Correct Answer:- Option-C

Question55:-

Which of the following is a confirmatory test for syphilis ?

A:-

Venereal Disease Research Laboratory test

B:-

Toluidine Red Unheated Serum test

C:-

Treponema Pallidum Haemagglutination Assay

D:-

Rapid Plasma Reagin Test

Correct Answer:- Option-C

Question56:-

Which of the following is correct about malaria caused by *Plasmodium falciparum* ?

A:-

Young RBC's and reticulocytes are attacked

B:-

Double dot ring forms seen in the peripheral blood smear

C:-

Gametocytes in peripheral blood smear are spherical in shape

D:-

Parasitised RBCs are enlarged

Correct Answer:- Option-B

Question57:-

All are correct about Bio fire film array Except

A:-

Completely automated

B:-

Works on the principle of Multiplex nested PCR

C:-

Can detect only bacterial pathogens

D:-

Approximate turnaround time is 1 hr

Correct Answer:- Option-C

Question58:-

All of the following are correct of *Corynebacterium diphtheriae* Except.

A:-

Gram stain of throat swab from a diphtheria case shows gram positive bacilli with palisade arrangement

B:-

Produces black colored colonies on Potassium Tellurite agar

C:-

Toxin produced is phage coded

D:-

Elek's gel precipitation test confirms the toxigenicity

Correct Answer:- Option-A

Question59:-

What is the protective Anti HBs titer in recipients of Hepatitis B vaccination ?

A:-

$\geq$ 5 mIU/ml

B:-

$\geq$ 10 mIU/ml

C:-

$\geq$ 50 mIU/ml

D:-

$\geq$ 1 mIU/ml

Correct Answer:- Option-B

Question60:-

Which of the following is a false statement regarding *Candida auris* ?

A:-

Causes blood stream infections in ICU patients on IV catheters . . .

B:-

Fluconazole is the drug of choice for invasive infections

C:-

Identification is confirmed with MALDI-TOF mass spectrometry

D:-

Is negative for germ tube test

Correct Answer:- Option-B

Question61:-

_____ is the most widely used microbial system of choice for the expression of heterologous proteins

A:-

Thermus aquaticus

B:-

E. Coli

C:-

Lactobacillus

D:-

Aspergillus flavus

Correct Answer:- Option-B

Question62:-

A process established in Finland to obtain single cell protein from the fungi to feed animals is known as

A:-

Quorn process

B:-

Torula yeast process

C:-

Spirulina cultivation process

D:-

Pekilo process

Correct Answer:- Option-D

Question63:-

_____ reduces the viscosity of fruit juice during the clarifying process and improves pulp pressing ability.

A:-

Pectinase

B:-

Lipases

C:-

Protease

D:-

All of these

Correct Answer:- Option-A

Question64:-

In batch fermentation, the growth rate of microorganisms primarily depends on

A:-

Dilution rate

B:-

Substrate concentration

C:-

Agitation speed

D:-

Oxygen transfer coefficient

Correct Answer:- Option-B

Question65:-

The parameter that best represents the efficiency of oxygen transfer in a bioreactor is

A:-

Reynolds number

B:-

Specific growth rate (μ)

C:-

Oxygen uptake rate

D:-

Volumetric oxygen transfer coefficient (kLa)

Correct Answer:- Option-D

Question66:-

Polyhydroxyalkanoates (PHAs) are intracellularly accumulated by microorganisms mainly under conditions of

A:-

Excess nitrogen and limited carbon

B:-

Balanced nutrient supply

C:-

Excess carbon and limited nutrients

D:-

High oxygen tension

Correct Answer:- Option-C

Question67:-

Secondary metabolites such as antibiotics are generally produced during which growth phase ?

A:-

Lag phase

B:-

Exponential phase

C:-

Stationary phase

D:-

Death phase

Correct Answer:- Option-C

Question68:-

Which of the following is primarily a downstream processing step ?

A:-

Sterilization of media

B:-

Inoculum development

C:-

Cell disruption

D:-

Aeration control

Correct Answer:- Option-C

Question69:-

Penicillin is commercially produced using which fermentation method ?

A:-

Batch fermentation

B:-

Continuous fermentation

C:-

Solid state fermentation

D:-

Fed-batch fermentation

Correct Answer:- Option-D

Question70:-

The main advantage of immobilized enzymes in industrial processes is

A:-

Increased mutation rate

B:-

Reduced product inhibition

C:-

Ease of enzyme recovery and reuse

D:-

Higher contamination risk

Correct Answer:- Option-C

Question71:-

Heat shock proteins in thermophiles help them to survive high temperature stress mainly because they
i. Increase membrane permeability
ii. Prevent denaturation of proteins
iii. Degrade ribosomal RNA
iv. Inhibit transcription

A:-

i and ii

B:-

ii

C:-

All the above

D:-

iii and iv

Correct Answer:- Option-B

Question72:-

Which biosafety level (BSL) is generally recommended for work involving genetically modified microorganisms with moderate risk ?

A:-

BSL-2

B:-

BSL-3

C:-

BSL-1

D:-

BSL-4

Correct Answer:- Option-A

Question73:-

Which of the following statements about bioaerosols is/are not true ?

i. Bioaerosols include bacteria, fungi, viruses, pollen and their fragments

ii. Bioaerosols can be present in both indoor and outdoor air

iii. Bioaerosols consist only of pathogenic microorganisms

iv. Bioaerosols cannot remain suspended in air

A:-

ii

B:-

i and ii

C:-

All the above

D:-

iii and iv

Correct Answer:- Option-D

Question74:-

Which of the following is classified as *in situ* bioremediation ?

A:-

Composting

B:-

Biopiles

C:-

Biosparging

D:-

Landfarming

Correct Answer:- Option-C

Question75:-

Which of the following techniques is used to study unculturable microorganisms in environmental samples?

A:-

Most Probabale Number (MPN) method

B:-

Enrichment culture technique

C:-

Anaerobic roll-tube method

D:-

Metagenomic analysis

Correct Answer:- Option-D

Question76:-

Bt brinjal is genetically modified primarily to confer resistance against which pest ?

A:-

Aphids

B:-

Whiteflies

C:-

Fruit and shoot borer

D:-

Leaf miner

Correct Answer:- Option-C

Question77:-

Which of the following organisms is commonly used as a biological indicator of faecal contamination in water ?

A:-

Pseudomonas aeruginosa

B:-

Escherichia coli

C:-

Nitrosomonas

D:-

Azotobacter

Correct Answer:- Option-B

Question78:-

Which C : N ratio is considered optimal for efficient composting ?

A:-

60 – 80 : 1

B:-

10 : 1

C:-

.5 : 1

D:-

25 – 30 : 1

Correct Answer:- Option-D

Question79:-

In the activated sludge process, the main function of aeration is to

A:-

Remove suspended solids

B:-

Supply oxygen and keep microbes in suspension

C:-

Kill pathogenic microorganisms

D:-

Reduce pH of wastewater

Correct Answer:- Option-B

Question80:-

If the Chemical Oxygen Demand (COD) of wastewater is high but the Biological Oxygen Demand (BOD) is low, the wastewater is most likely to contain

A:-

Easily biodegradable organic matter

B:-

Mainly inorganic pollutants

C:-

Non-biodegradable or toxic organic compounds

D:-

High dissolved oxygen

Correct Answer:- Option-C

Question81:-

Preformed toxin in food poisoning cases is produced by

A:-

Bacillus cereus

B:-

Staphylococcus aureus

C:-

Clostridium botulinum

D:-

a and b

Correct Answer:-Question Cancelled

Question82:-

The transport media and enrichment media which increases the isolation of Shigella are

A:-

Buffered glycerol saline, Alkaline peptone water

B:-

Alkaline peptone water, Buffered glycerol saline

C:-

Buffered glycerol saline, Selenite F broth

D:-

Buffered glycerol saline, Wilson Blair media

Correct Answer:- Option-C

Question83:-

Non typhoidal Salmonella include all except.

A:-

Salmonella choleraesuis

B:-

Salmonella paratyphi A

C:-

Salmonella typhimurium

D:-

Salmonella enteritidis

Correct Answer:- Option-B

Question84:-

Major causative agent of traverllers diarrhoea

A:-

EHEC

B:-

ETEC

C:-

EPEC

D:-

EIEC

Correct Answer:- Option-B

Question85:-

Detection of clostridium perfringens exotoxin in suspected food/stool specimen is by

A:-

Cytopathic toxin assay

B:-

ELISA

C:-

PCR detecting cpe gene

D:-

All the above

Correct Answer:- Option-D

Question86:-

Most common source of food borne botulinum is

A:-

Poultry and diary products

B:-

Canned food

C:-

Green leafy vegetables

D:-

Shell fish

Correct Answer:- Option-B

Question87:-

The best method to detect staphylococal enterotoxin in food is all except.

A:-

Quantitative culture

B:-

ELISA

C:-

Latex agglutination

D:-

Multiplex PCR

Correct Answer:- Option-A

Question88:-

Indicator organisms of feacal pollution of water includes all except.

A:-

Coliforms

B:-

Feacal streptococi

C:-

Thermotolerant E coli

D:-

Acinetobacter

Correct Answer:- Option-D

Question89:-

The infective dose of clostridium perfringens causing food poisoning is

A:-

10^2 viable bacilli

B:-

10^4 viable bacilli

C:-

10^6 viable bacilli

D:-

10^8 viable bacilli

Correct Answer:- Option-D

Question90:-

Extrinsic factor that influences microbial content of food is

A:-

Temperature of storage

B:-

Gaseous atmosphere

C:-

Redox potential

D:-

a and b

Correct Answer:- Option-D

Question91:-

The most appropriate techniques is for estimation of *viable* microbial populations in soil is

A:-

Metagenomic sequencing

B:-

Plate count method

C:-

Phospholipid fatty acid analysis (PLFA)

D:-

Soil respiration assay

Correct Answer:- Option-B

Question92:-

Which of the following statements are correct regarding the structure-function coupling and regulation of nitrogenase enzyme complex ?
i. Electron transfer from the Fe-protein to the MoFe-protein requires ATP-dependent conformational changes in the Fe-protein.
ii. The P-cluster functions as an intermediate electron carrier between the Fe-protein and the FeMo-cofactor.
iii. Nitrogenase catalysis proceeds with obligatory hydrogen evolution even in the absence of dinitrogen

A:-

Only i and ii

B:-

Only ii and iii

C:-

Only i and iii

D:-

All of the above

Correct Answer:- Option-D

Question93:-

Which of the following statements are correct regarding the rhizosphere effect ?
i. The rhizosphere effect refers to the increase in microbial population density near the root surface compared to bulk soil.
ii. Root exudates are a primary driver of changes in microbial activity in the rhizophere.
iii. The rhizosphere effect is uniform across all plant species and soil types.

A:-

Only i and ii

B:-

Only ii and iii

C:-

Only i and iii

D:-

All of the above

Correct Answer:- Option-A

Question94:-

Which plant-microbe interaction is best described as *associative* ?

A:-

Rhizobium-legume symbiosis

B:-

Endophytic colonization of rice roots by *Azospirillum*

C:-

Mycorrhizal association in forest trees

D:-

Pathogenic infection by *Xanthomonas*

Correct Answer:- Option-B

Question95:-

Production of siderophores by rhizobacteria mainly contributes to plant growth promotion by

A:-

Increasing nitrogen fixation

B:-

Enhancing iron availability

C:-

Solubilizing phosphorus

D:-

Producing phytohormones

Correct Answer:- Option-B

Question96:-

Which of the following is a key advantage of plant microbiome studies using high-throughput sequencing ?

A:-

Identification of only culturable microbes

B:-

Quantifiction of soil enzyme activity

C:-

Detection of unculturable microbial diversity

D:-

Measurement of microbial respiration rates

Correct Answer:- Option-C

Question97:-

Which of the following statements are correct regarding assimilatory nitrate reduction in plants and microorganisms ?

i. Assimilatory nitrate reduction converts nitrate to ammonia for incorporation into cellular biomass

ii. Nitrate reductase invovled in assimilatory reduction is generally cytosolic in plants.

iii. Assimilatory nitrate reduction serves as a major pathway for energy generation under anaerobic conditions.

A:-

Only i and ii

B:-

Only ii and iii

C:-

Only i and iii

D:-

All of the above

Correct Answer:- Option-A

Question98:-

Which of the following statements is/are correct regarding phyllosphere microorganisms ?

i. The phyllosphere refers to the microbial habitat on aerial parts of plants, especially leaf surfaces.

ii. Phyllosphere microorganisms are exposed to environmental stresses such as UV radiation and desiccation.

iii. The phyllosphere generally supports higher microbial populations than the rhizosphere.

A:-

Only i and ii

B:-

Only ii and iii

C:-

Only i and iii

D:-

All of the above

Correct Answer:- Option-A

Question99:-

Which enzyme complex is directly responsible for the reduction of atmospheric nitrogen to ammonia in biological nitrogen fixation ?

A:-

Nitrate reductase

B:-

Nitrite reductase

C:-

Nitrogenase

D:-

Glutamine synthetase

Correct Answer:- Option-C

Question100:-

In the carbon cycle, which microbial process directly contributes to long-term soil carbon sequestration ?

A:-

Mineralization

B:-

Methanogenesis

C:-

Humification

D:-
Respiration

Correct Answer:- Option-C